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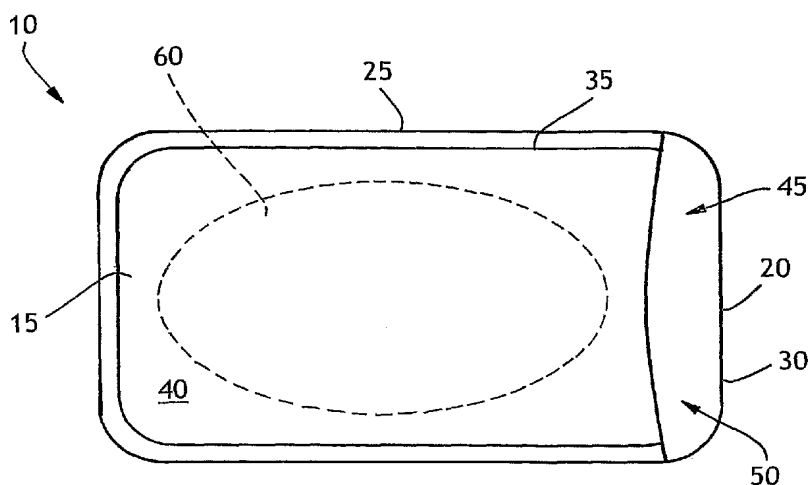
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(54) **Title:** TWO-SIDED APPLICATOR WITH REACTIVE OR COMPLEMENTARY CHEMISTRIES



(57) **Abstract:** The invention described herein provides an applicator (10) for applying a substance, the applicator including an application side (15) and an opposed reactive side (20), the application side (15) including an application substance and the reactive side (20) including a reaction substance, wherein the application and reaction substances react with each other when the application and reactive sides (15, 20) of the applicator (10) are sequentially- wiped on a target surface. Also provided is a method for treating a target surface, the method including contacting the target surface with an application side (15) of an applicator (10) including an application substance, whereby the application substance is deposited onto the target surface; and thereafter contacting the target surface with a reactive side (20) of the applicator (10) including a reaction substance, whereby the reaction substance reacts with the application substance.



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TWO-SIDED APPLICATOR WITH REACTIVE OR COMPLEMENTARY CHEMISTRIES

Background of the Invention

5 As consumers become more sophisticated, they look for new cleaning products to make their lives easier. While certain combinations of substances may provide a benefit, they may not be conveniently available to consumers in a usable form because they are reactive with each other in storage. Therefore there is a need for a product form that allows novel cleaning substances to be safely and
10 reliably provided to the consumer.

Summary of the Invention

 It has now been discovered that certain reactive substances may be provided in a single wiping product that provides unique cleaning or cleaning-related benefits.

15 The invention disclosed herein solves the problem of complicated reactive chemistries by providing an applicator for applying a substance, the applicator including an application side and an opposed reactive side, the application side including an application substance and the reactive side including a reaction substance, wherein the application and reaction substances react with each other
20 when the application and reactive sides of the applicator are sequentially wiped on a target surface.

 The present invention also provides an applicator for applying a substance, the applicator including an application side and an opposed reactive side, the application side including an application substance and the reactive side including
25 a reaction substance, wherein the application substance is deposited on a target surface, and wherein the reaction substance supplements the action of the application substance when the application and reactive sides of the applicator are sequentially wiped on the target surface.

 The present invention also provides an applicator for applying a substance,
30 the applicator including an application side and an opposed reactive side, the application side including an application substance and the reactive side including a reaction substance, wherein the application and reaction substances are

deposited on a target surface when the application and reactive sides of the applicator are sequentially wiped on the target surface.

The present invention also provides a method for treating a target surface, the method including contacting the target surface with an application side of an applicator including an application substance, whereby the application substance
5 is deposited onto the target surface; and thereafter contacting the target surface with a reactive side of the applicator including a reaction substance, whereby the reaction substance reacts with the application substance.

Brief Description of the Drawings

10 Fig. 1 is a schematic view of an applicator according to the present invention.

Detailed Description of the Preferred Embodiments

As used herein, the term "applicator" means any flexible structure adapted
15 to be used in conjunction with a hand or a tool to clean a surface, or to apply or remove a substance from a surface. Advantageously, the structure may be generally flat and have distinct opposing sides. A chemical or other substance may be included with the applicator. The applicator may take the form of a mitt, a wipe, a tool cover, or any other suitable form. The portions of the structure
20 including the different substances may be provided with visual indicia, such as color coding, to provide the user with guidance for proper hand placement, or to determine in what order the sides are to be used.

As used herein, the term "mitt-like" means an applicator adapted to receive and fully or partially enclose a person's hand or a tool when the structure is being
25 used. It may or may not have a separate opening other accommodation for a thumb and/or one or more fingers for stability or control during use. However, the structure may also be generally cylindrical, somewhat like a sock, such that the opposing sides result from the position of the user's hand within. In such a case, the portion of the structure contacting the palm of the hand becomes one side of
30 the mitt-like applicator and the portion of the structure contacting the back of the hand becomes the opposing side. The mitt-like applicator can be sized to fit over one or multiple fingers.

As used herein, the term “wipe” means an applicator adapted to be held by a user or a tool but that is not adapted to receive and fully or partially enclose a person's hand when the structure is being used.

As used herein, the term “sequentially wiped” means one side of the applicator contacts a target surface and thereafter the other side of the applicator contacts the same target surface with sufficient pressure, friction, movement, or other mechanism to cause reactive substances from both sides of the applicator to mix and in some cases react with each other. Most typically, each time a target surface is wiped with the applicator, the reactive substance associated with the side of the applicator in contact with the target surface is transferred to the target surface being wiped.

As used herein, the terms “target surface” and “surface” refer to the surface upon which the applicator is acting and treating. The term “surface” and its plural generally refer herein to the outer or the topmost boundary of an object. Surface may refer to that of skin, hair, fur, clothing, upholstery, countertops, floors, walls, windows, tables, appliances, bathroom fixtures, automobiles, or any other object that may require or accommodate bathing, cleaning, removing something from, or applying something to its surface. The term is used to distinguish from and avoid confusion with references to the various surfaces of the applicator.

Fig. 1 illustrates an applicator 10 in accordance with the present invention. A mitt-like applicator is used herein as a non-limiting example of the applicator 10 of the present invention. In other aspects of the present invention, the applicator 10 may be a wipe, a pad, a tool cover, or any other suitable form. More specifically, the mitt-like applicator 10 is shown including an application side 15 and an opposed reactive side 20.

The applicator 10 includes an application side 15. The application side 15 may be of any suitable shape, but is preferably generally planar and is further preferably generally rectangular or oblong. The application side 15 has a perimetric edge 25 extending around the application side 15. In one aspect of the present invention, the application side 15 is generally the size of a human hand held flat on a surface. In another aspect of the present invention, the application side 15 is generally the size of the four fingers of a human hand. In still another aspect of the present invention, the application side 15 is generally the size of a

human finger. The applicator 10 may be manufactured in any shape or of any dimensions, including as a pad or wipe sized to fit best in a child's hand, an adult hand, or on any cleaning implement. In general, the application side 15 may be of any suitable size, with the size preferably selected to be suitable for the intended use of the applicator 10. In other aspects of the present invention, the applicator 10 may be manufactured into other shapes such as a mitt or square or round pads or mitts, etc. In another aspect of the present invention, the application side 15 may be pleated, layered, or of any other suitable structure if additional surface area or liquid holding capacity is desired.

The application side 15 includes a base sheet. Suitable materials for making the application side base sheet include non-woven synthetic fibrous webs, such as meltblown, spun-bond, coform, cellulosic webs, woven webs, and any other suitable material. Plastic film or other suitable materials may be used to form one or more barrier layers on the inside of the applicator 10 to prevent premature contact between substances or to protect the user's hand from contact with substances during use. The application side 15 may be a stretch-bonded laminate (SBL) with pre-stretched elastic filament and meltblown material with one ply of spunbond material on each outer surface and a basis weight of approximately 70 gsm, but any suitable absorbent material may be used. SBL and other composite nonwoven elastic webs are further described in U.S. Patent No. 4,657,802 to Morman. In one aspect of the present invention, the application side 15 includes a dry embossed 110 grams per square meter (gsm) coform laminate available from Kimberly-Clark Corporation. In other aspects of the present invention, the application side 15 may include any suitable nonwoven or woven materials or polymer sheeting of any suitable basis weight, and may be constructed from or may include an absorbent material. The material of the application side 15 may act to protect a user's hand from contacting the target surface.

The applicator 10 also includes an opposed reactive side 20. The reactive side 20 is preferably of the same general size and shape of the application side 15, although the size and/or shape of the reactive side 20 may be selected to be different from the size and/or shape of the application side 15 based on the intended use of the applicator 10. The reactive side 20 has a perimetric edge 30 extending around the perimeter of the reactive side 20. The reactive side 20 may

be manufactured from the same material as the application side 15, or from a different material. In another aspect of the present invention, the reactive side 20 may be pleated, layered, or of any other suitable structure if additional surface area or liquid holding capacity is desired.

5 In another aspect of the present invention, one or both of the application and reactive sides 15, 20 may be breathable to allow air to circulate through the applicator 10.

The application side 15 is coupled to the reactive side 20. One of the application and reactive sides 15, 20 is positioned to overlie the other of the application and reactive sides 15, 20, such that the perimetric edges 25, 30 of the application and reactive sides 15, 20 generally align. A portion of the perimetric edge 25 of the application side 15 is attached to the perimetric edge 30 of the reactive side 20 to form a seam 35. The seam 35 formed may be at the perimetric edges 25, 30, or the seam 35 may be adjacent or inward from the perimetric edges 25, 30. The perimetric edges 25, 30 may be attached by adhesive, ultrasonic bonding, heating, sewing, or by any other suitable method. The seam 35 around the periphery not only connects the application side 15 and the reactive side 20, but also prevents the substance(s) in one side from migrating to the other side, particularly if the substances in one or both sides are liquid or are in solution.

20 In another aspect of the present invention, the applicator 10 may be formed as a seamless tube with adequate physical separation forming a sufficient barrier between the substances. In a related aspect, patches of base material may be coupled to the applicator 10, where each patch includes a substance.

Coupling the application side 15 to the reactive side 20 forms the applicator 10 with a bag-like structure having an outer surface 40 and an interior space 45 with an applicator opening 50. The applicator 10 may be formed such that the interior space 45 is sized to accommodate a human hand, a portion of a human hand, a bathing tool, or any other suitable item. Because of this bag-like design, the applicator 10 may be turned inside-out by a user such that the previous interior space 45 becomes the new outer surface, and the previous outer surface 40 becomes and defines the new interior space. In turning the applicator 10 inside-out, any dirt or other substances captured on the previous outer surface 40 of the applicator 10 becomes captured within the new interior space of the applicator 10.

By virtues of the design and materials chosen for the applicator 10, the applicator 10 is preferably designed to be disposable. In this case, disposable means that the applicator 10 is disposed of, rather than cleaned, after use.

In an alternative aspect of the present invention of the applicator 10, the application side 15 and the reactive side 20 are two portions of the same piece of material. One of the application and reactive sides 15, 20 is folded over the other of the application and reactive sides 15, 20 and a portion of their perimetric edges 25, 30 are coupled by any means described herein to form the applicator 10. In this aspect, a seam 35 or equivalent structure is still needed to prevent the substance(s) in one side from migrating to the other side, particularly if the substances in one or both sides are liquid or are in solution.

The applicator 10 may include one or more thumb holes (not shown). In one aspect of the present invention, the thumb holes are formed as openings in the seam 35 between the application and reactive sides 15, 20. Positioning thumb holes on opposite sides of the applicator 10 allows the applicator 10 to be used on the user's right or left hand. In other aspects of the present invention, one or more thumb holes may be positioned or formed in one or both of the application and reactive sides 15, 20. The thumb holes may also be partially formed with a cutout in one of the application or reactive sides 15, 20.

In an alternative aspect of the present invention (not shown), the applicator 10 may include a thumb space at least partially separated from the interior space 45 and sized to accommodate a human thumb. A thumb space helps to stabilize the applicator 10 in use by helping to prevent rotation of the applicator 10 around a user's hand. In another alternative aspect of the present invention, the applicator 10 may also be manufactured with a second thumb space (not shown) on the opposing perimetric edge 25 of the applicator 10, such that one thumb space may be used when the application side 15 is used, and the other thumb space (not shown) may be used when the reactive side 20 is used.

In other aspects of the present invention, the applicator 10 may include additional and alternative features such as a reinforcing cuff, an access flap, an elastic cuff mechanism, and those features described in co-assigned U.S. Patent Nos. 5,542,566, 5,616,201, and 5,649,336, incorporated herein by reference

The applicator 10 also includes an application substance included on or in the application side 15, and a reaction substance included on or in the reactive side 20. The application and reaction substances may react with each other to form a third substance, or the application and reaction substances may be complementary to each other to provide enhanced or supplemented cleaning, treating, or other use. The substances included with each side of the applicator 10 may be distributed in any manner suitable for transfer to a target surface. For example, the substances may be evenly distributed within a side or may be provided in a zoned distribution. Suitable means for incorporating the substances into or onto the application and reactive sides 15, 20 of the applicator 10 include spraying, dipping, printing, dusting, and any other suitable means.

In other aspects of the present invention, one or more substances may be disposed in a burstable bladder 60 or a bladder 60 that may be opened or unsealed. The bladder 60 may be of any suitable design, including those disclosed in co-pending U.S. Patent Application Serial No. 11/303,061, filed on December 13, 2005 and titled "Device with Internal Pull Tab Activation." The bladder 60 may be associated with a particular side or sides by any suitable means, and may be positioned within the interior space 45; between one or both of the application and reactive sides 15, 20 and a barrier layer associated with that side; or on the outer surface 40 associated with one or both of the application and reactive sides 15, 20.

The applicator 10 may be packaged in various manners depending on the intended use of the applicator 10. If the substance on one or both of the application and reactive sides 15, 20 is a liquid, then that surface or those surfaces may be covered by a film material to prevent inadvertent substance transfer from that surface or those surfaces. In another aspect of the present invention, if only one of the application and reactive sides 15, 20 includes a liquid substance, then the applicator 10 may be folded, for example in half, such that the side including the liquid substance is on the inside of the fold to prevent inadvertent transfer of the liquid substance. In another aspect of the present invention, the edges of the folded applicator 10 may be sealed to prevent escape of a liquid substance.

In use of the applicator 10, a user places the applicator 10 on the user's hand or on a tool, or the user holds or dons the applicator 10. The user wipes the

application side 15 of the applicator 10 on a surface to be cleaned or treated, thereby depositing the application substance on that surface. The user then wipes the reactive side 20 of the applicator 10 on the same surface such that the reaction substance may react with or supplement the application substance. The

5 application and reaction substances may react on the surface or on the reactive side 20 of the applicator 10. In some aspects of the present invention, water may be added by the user to the applicator 10 to dissolve or otherwise activate one or both substances prior to wiping.

As described above, the substances may be impregnated or saturated into
10 the applicator 10. The application and reactive sides 15, 20 distribute and/or mix the substances. The applicator 10 may be adapted to enable one of two cleaning or treating schemes. The first relies on activation chemistry: substances from the application and reactive sides 15, 20 mix to activate a cleaning or treating composition that has a single cleaning or treating purpose. The application and
15 reactive sides 15, 20 keep the substances separate until used. The second cleaning or treating scheme enables the ease of application for the completion of task chemistry using substances that are complementary: the application and reactive sides 15, 20 include substances that are complementary and when used together produce more effective cleaning or treatment results if applied
20 sequentially rather than together.

In one exemplary aspect of the complementary treatment scheme, a fragrance completes the cleaning job for a consumer by leaving a cue that the task has been completed. Separating the fragrance from an effective, efficient cleaning substance means the cleaning task is completed faster with the same "complete
25 task" cue as that obtained with a longer and more arduous cleaning process. The faster completion results from the cleaning substance not needing to compete with the fragrance and from the cleaning substance not becoming at least partially deactivated by contact with the fragrance while in storage or shipping. In any of these aspects, the cleaning substance may be one or more of a bleach, an
30 oxidation agent, a reduction agent, an anti-microbial agent, or any other suitable cleaning substance.

In the first cleaning or treating scheme, a variety of different reactive chemistries may be utilized. Such reactive chemistries employ a substance on

one of the application and reactive sides 15, 20 that will react with a substance on the other of the application and reactive sides 15, 20 to create a third substance that will be effective for cleaning, treating, or other use. Examples of such reactive chemistries include, without limitation, the following:

5 (1) Heat generation for comfort or cleaning. The use of two substances that react exothermically provides heat when the reactive side 20 is wiped over a substance deposited by the application side 15. In particular, a weak acid powder, such as citric or malic acid, may be provided by one side and a weak base, such as sodium bicarbonate, sodium borate, potassium phosphate or sodium citrate,
10 may be provided by the other side to form a solution. The acid and base are balanced to raise the solution temperature for maximum cleaning.

 (2) Activation of a peroxide bleach for effective bleaching at ambient temperatures. For example, a monopersulfate peroxygen bleaching compound and a bicyclic or tricyclic diketone bleach activator will react together in aqueous
15 solution to form a dioxirane bleaching composition. Alternatively, a peroxygen bleach may be activated by pH adjustment by creating a pH shift that enhances the bleaching effect of hydrogen peroxide. Hydrogen peroxide lacks adequate storage stability to be a viable consumer product at low pH when sold in an aqueous solution. A weak acid, such as citric acid, may be employed in the form
20 of a dry powder on the side of the applicator 10 opposite the side including hydrogen peroxide to enhance the bleaching power of the hydrogen peroxide at the target surface. In another example, a dry bleaching composition particularly useful for low temperature applications is provided in which generation of hypochlorite by reaction between a peroxygen bleaching agent and a chloride salt
25 is promoted by an aromatic diol or oxidized aromatic diol activator. Preferred activators are in ester form and provide hypochlorite generation at levels of less than about 20 ppm for at least about the first two minutes following dissolution of the compositions in an aqueous solution, but rising to effective bleaching levels within a reasonable time thereafter. The initially low hypochlorite level assists in
30 the functioning of laundry additives, such as fabric brighteners.

 (3) Generation of other bleaches for effective bleaching at ambient temperatures. For example, a chloroisocyanurate disposed in dry form on one side of the applicator 10, when combined with a buffer on the other side of the

applicator 10, generates sodium hypochlorite *in situ* when water is added to the applicator 10. In this example, the applicator 10 with the chloroisocyanurate typically needs to be sealed prior to use to keep humidity out. In another example, sodium hypochlorite can be combined with a buffer, generally at a pH of between about 6.0 and 7.0. The buffer pH may be lower so long as chlorine gas is not generated by the combination. This combination generates hypochlorous acid *in situ*. Forming hypochlorous acid *in situ* is advantageous because it has a very short shelf life, and because it is an effective hard surface cleaning substance and disinfectant.

(4) Generation of small amounts of chlorine dioxide or chlorine for *in situ* bleaching. For example, sodium chloride may be oxidized in an aqueous solution to form chlorine dioxide. In one exemplary aspect of the present invention, one side of the applicator 10 includes a solution of sodium chlorite while the other side of the applicator 10 includes an oxidizing substance either as a solid or as a solution. Whether or not a particular reaction of an oxidizing agent and a metal will occur spontaneously may be predicted by reference to a standard table of half cell potentials such as that in CRC Handbook of Chemistry and Physics (CRC Press). If the sum of the potentials of the oxidation half-reaction and the reduction half-reaction is positive, then the reaction will occur spontaneously.

Limited conversion of sodium chlorite to chlorine dioxide is desirable for most applications in which the applicator 10 is intended for hard surface sanitation to avoid release of significant amounts of chlorine dioxide gas into the air. The level of chlorine dioxide generated in the cleaning solution delivered by the applicator 10 at any given time is preferably from about 5 ppm to about 120 ppm, such as from about 10 ppm to about 100 ppm, and such as from about 10 ppm to about 60 ppm. In addition, a limited conversion of chlorite to chlorine dioxide extends the length of time for which the applicator 10 may produce and sustain levels of chlorine dioxide within the aforementioned range. In general it is preferable that the applicator 10 sustain a level of chlorine dioxide of between 10 ppm and 120 ppm for a period of from about 30 seconds to about 15 minutes or more. The applicator 10 may sustain a level of chlorine dioxide such as from about 45 seconds to about 12 minutes, or such as from about 1 minute to about 10 minutes.

(5) General cleaning and air freshening. One side of the applicator 10 may include an all-purpose cleaning substance that may be acidic, basic, or including an oxidant. The other side of the applicator 10 may include a microencapsulated fragrance ingredient for air freshening. In use, the ionic strength of the cleaning solution causes the fragrance ingredient to migrate to the air/liquid interface and bloom. This would provide an efficient and effective delivery of fragrance without excessive loss of intensity due to dilution in the cleaning solution. The encapsulated storage of the fragrance ingredient avoids any issue of fragrance incompatibility with the cleaning solution. In this aspect, one side of the applicator 10 includes an aqueous cleaning solution, such as a cleaning solution including a surfactant and water, while the other side of the applicator 10 includes an encapsulated fragrance ingredient. The encapsulate material is water soluble. A surface is wiped with the moist side of the applicator 10 and transfers moisture to the surface. When excess moisture is wiped with the other side of the applicator 10, the encapsulating material dissolves and the fragrance is released. In another aspect, the fragrance encapsulation is not water-soluble, and the fragrance side of the applicator 10 includes rinsing water. In this aspect, mechanical force produced by wiping with the fragrance side causes the encapsulation to rupture, thus releasing the fragrance. In either case there is a better chance of getting a desirable fragrance with less fragrance ingredient.

(6) Visual indication of disinfection. One side of the applicator 10 may include a peroxide or hypochlorite bleach and the other side may include a weak dye that decolorizes in a short time when exposed to the bleach. The disappearing dye color gives the user a timer for disinfectant action. Disinfectants need a span of time while wet on the surface to actually achieve desirable bacteria kill levels. Instructions and timing with respect to disinfectants are government-regulated. A user-friendly timing system resident in the applicator 10 helps to ensure that government regulations are met by the user without the user needing to know about the requirements or even the existence of such regulations.

(7) Epoxy finishes. Many light-, moisture-, and oxygen-initiated epoxy reactions provide stain repellency or other protective finishes. In simplistic terms, an epoxy is typically formed by combining two epoxy reactants and then applying the mixture to a surface. One epoxy reactant may be provided by one side of the

applicator 10 and the other epoxy reactant may be provided by the other side of the applicator 10. Ambient conditions would provide the initiator for the reaction.

In another aspect of the present invention, the epoxy applicator includes a catalyst system. Both epoxy reactants are provided on one side of the applicator 10 and the catalyst element is provided on the other side of the applicator 10. As the concentration of the catalyst is not important to the epoxy reaction product other than to affect the rate, variation in the amount of catalyst applied may have less of an impact on final quality than if the two epoxy reactants are supplied separately. See following reference: Blank, Werner J., et al., "Catalysis of the Epoxy Carboxyl Reaction", Presented at the International Waterborne, High Solids and Powder Coatings Symposium, Feb. 21-23, 2001.

In one exemplary aspect, one side of the applicator 10 may include a 1:1 molar blend of a glycidyl ester functional resin such as GMA 207-SA available from Reichhold Chemical and a carboxyl functional acrylic resin such as Joncryl 819 available from Johnson Polymer. The resins may be applied to the applicator 10 without additional substances or may be incorporated with an appropriate volatile organic solvent. The reactive side of the applicator 10 may include a catalyst such as 2-ethylhexyl amine, 2-ethylimidazole, or a similar compound. When the application side 15 of the applicator 10 is wiped on the surface the glycidyl ester functional resin and the carboxyl functional acrylic resin are transferred to the surface. When the surface is subsequently wiped with the reactive side 20 of the applicator 10, the amine catalyst is transferred to the surface to catalyze the reaction between the glycidyl ester functional resin and the carboxyl functional acrylic resin.

Within the scope of the present invention is further treating the target surface with heat to assist the crosslinking reaction of the epoxy. For example, a small metal part may be wiped with the application and reactive sides 15, 20 of the applicator 10 and then placed in a curing oven at a temperature of from about 100°C to about 200°C or more to facilitate the crosslinking reaction. In general, the epoxy reactants include a diglycidyl ether or other chemical compounds including oligomeric species including two or more unreacted epoxy groups. Bisphenol A glycidylether and its oligomers are especially preferred. Another class of commonly used materials is glycidyl ester resins, especially preferred are the

glycidyl ester functional acrylic resins. These substances may be homopolymerized or reacted with active hydrogen including compounds such as carboxyl or anhydride groups. Both homogeneous and heterogeneous crosslinking may occur without a catalyst but may be minimized by appropriate control of storage conditions such as pH. Catalysts are used to facilitate the crosslinking reaction. Such catalysts include amine and phosphonium functional compounds such as 2-ethylhexyl amine, Bis-(2-ethylhexyl) amine, tetrabutylphosphonium bromide, 2-ethylimidazole, tetramethyl guanidine, and benzyltrimethylammonium bromide. In addition, various metal salts known in the art may also be used. Especially preferred are zinc and zirconium salts such as zinc acetate, zinc acetylacetonate, and zirconium octonate.

(8) Foaming reaction for suds generation. Any substance combination releasing carbon dioxide or harmless gas during the reaction may be used. For example, sodium bicarbonate, calcium carbonate or sodium bicarbonate embedded with citric acid powder may be used to boost foaming in a surfactant system. The foam may be made to dissipate quickly, but would still provide an active cleaning signal to the user. The application side 15 of the applicator 10 includes an acid or base substance in conjunction with a foaming surfactant. The reactive side 20 of the applicator 10 includes a substance having a pH more acidic or more basic than the substance on the application side 15 of the applicator 10. Whether a basic or acidic system is used on the application side 15 of the applicator 10 depends upon the natures of the surfactant, of the acidic or basic species, and of the surface being cleaned. In one exemplary aspect of the present invention, a basic species is selected from the group of carbonate or bicarbonate salts. Such salts react with acid to generate carbon dioxide and assist in foam development. When a surface is first wiped by an acidic or basic substance, and then wiped by the side having an opposite pH classification, the neutralization reaction that occurs forms carbon dioxide and assists in the development of foam.

In an example of surface-specific use, the application side 15 may include an acidic system for use on surfaces best cleaned under acidic conditions, such as brass, copper, and other metals, or for use in removing an appropriate substance from a surface, such as removing metal, rust, or hard water staining from glass.

The reactive side 20 is then wiped on the surface to complete the cleaning and neutralize the acid.

In another example of a surface-specific use, the application side 15 includes a basic system for use on surfaces best cleaned under basic conditions, such as ceramics, glass, and some plastics and coatings. A basic system is particularly useful for removing grease and greasy residues. The reactive side 20 is then wiped on the surface to complete the cleaning and neutralize the base. These examples make a universal and multi-functional applicator 10.

In another example, isocyanurate or any other source of sodium hypochlorite is disposed in dry form on one side of the applicator 10, and a peroxide/surfactant blend is disposed on the other side of the applicator 10 or in a bladder 60. The combination of these substances generates oxygen, causing the surfactant to foam.

A foaming surfactant may be defined as one preferably having a foam height greater than 10 mm when measured according to the Ross-Miles method in the case of a solution including 0.02% by weight of surfactant (active substance) in distilled water at 25°C. Examples of such surfactants include foaming anionic surfactants. Exemplary foaming anionic surfactants include alkyl phosphates such as sodium lauryl phosphate; alkyl taurates such as sodium methyl palmitoyl taurate; sulfosuccinates such as cocoyl sulfosuccinate; alkyl sulphates such as triethanolamine lauryl sulfate; alkyl ether sulfates such as sodium lauryl sulphate; and alkyl ether carboxylates such as alkyloxy sodium decyl ether carboxylate. The foaming surfactant may also be non-ionic. Exemplary non-ionic foaming surfactants include polyglyceryl alkyl ethers such as polyglycerolated dodecanediol and alkylglucosides such as dodecyl glucoside. The surfactant may also be cationic. Examples of cationic foaming surfactants include to amine oxides and quaternary ammonium salts such as polyquaternium 22. Exemplary amphoteric foaming surfactants include disodium cocoamphodiacetate, cocamidopropylbetaine, and cocobetaine.

(9) Precipitation reaction. Enhanced cleaning may be achieved by in-situ generation of an abrasive substance. In this aspect of the present invention, the user may decide whether or not the cleaning applicator is used as an abrasive cleaning article or a non-abrasive cleaning article. For example, one side of the

applicator 10 may include an aqueous solution of a soluble salt. The other side of the applicator 10 includes a solution of a second soluble salt selected such that the combination of the first soluble salt solution with the second soluble salt solution creates an insoluble precipitate. In one exemplary aspect, the application side 15 of the applicator 10 includes a solution of a soluble calcium salt such as calcium chloride. The reactive side 20 of the applicator 10 includes a solution of a soluble carbonate salt such as sodium carbonate. When the application side 15 of the applicator 10 is wiped across the surface a layer of calcium chloride solution is deposited on the target surface. When the applicator 10 is wiped over the surface using the reactive side 20 of the applicator 10, an insoluble precipitate of calcium carbonate is formed. This insoluble precipitate serves as an abrasive agent. Either side of the applicator 10 may be used independently as a non-abrasive cleaning implement. It is only when one side and then the other side is used that an abrasive cleaning implement is achieved.

15 In another aspect of the present invention, one of the substances may be present in solid form on the applicator 10. The specific salts are selected such that an insoluble precipitate may be formed. The salts may be employed in conjunction with surfactants and/or any other cleaning formulations. The salts and surfactant are selected such that interaction between either of the salts and the surfactant does not deactivate the surfactant. In one exemplary aspect, calcium chloride is used as one of the salts, and the surfactant is preferably selected from a non-ionic or cationic surfactant to avoid precipitation of the calcium salt with the surfactant. As another example, the combination of sodium lauryl sulfate and soluble calcium salts will react to form calcium lauryl sulfate such that the surfactant properties of the original sodium lauryl sulfate will be lost.

As described above, the second cleaning or treating scheme enables the ease of application for the completion of task chemistry: the application and reactive sides 15, 20 include complementary substances that produce more effective cleaning or treatment results if applied sequentially rather than together.

30 In one exemplary aspect of the present invention, the applicator 10 may be used to apply a resoil preventative. The resoil preventative makes the cleaning task more effective by increasing the time between cleanings. Resoil preventatives, however, typically interfere with the effectiveness of cleaning

substances. When resoil preventatives and a cleaning substance are resident in the same formulation, the cleaning task requires more mechanical energy (such as work by the user) or contact time with the surface to clean as well as formulas that do not have the resoil preventative. In a specific example of this aspect,

5 application of an insect repellent after cleaning a surface keeps the cleaned surface cleaner longer because insects soil surfaces and introduce microbial organisms that contaminate clean surfaces.

The invention has been described with reference to various specific and illustrative aspects and techniques. However, it should be understood that many variations and modifications may be made while remaining within the spirit and scope of the invention.

10 Accordingly, this invention is intended to embrace all such alternatives, modifications and variations that fall within the spirit and scope of the appended claims.

We claim:

1. An applicator for applying a substance, the applicator comprising an application side and an opposed reactive side, the application side including an application substance and the reactive side including a reaction substance, wherein the application and reaction substances react with each other when the application and reactive sides of the applicator are sequentially wiped on a target surface.
2. The applicator of claim 1, wherein the application and reactive sides are separated by an interior space.
3. The applicator of claim 1, wherein the application substance is disposed in a bladder associated with the application side.
4. The applicator of claim 1, wherein the reaction substance is disposed in a bladder associated with the reactive side.
5. The applicator of claim 1, wherein the applicator is a mitt.
6. The applicator of claim 1, wherein the applicator is a wipe.
7. The applicator of claim 1, wherein one of the application and reactive sides includes a base sheet and a barrier layer.
8. The applicator of claim 1, wherein each of the application and reactive sides includes a base sheet and a barrier layer.
9. The applicator of claim 1, wherein the application substance is an acid, and wherein the reaction substance is a base.
10. The applicator of claim 1, wherein the application substance is a cleaning substance and wherein the reaction substance is a fragrance ingredient.

11. The applicator of claim 10, wherein the cleaning substance is one of a bleach, an oxidation agent, a reduction agent, and an anti-microbial agent.
12. The applicator of claim 1, wherein the application substance is a bleaching compound, and wherein the reaction substance is a bleach activator.
13. The applicator of claim 1, wherein the application substance is a bleaching compound, and wherein the reaction substance is a pH-adjusting agent.
14. The applicator of claim 1, wherein the application substance is sodium chloride, and wherein the reaction substance is an oxidizing agent.
15. The applicator of claim 1, wherein the application substance is sodium chlorite, and wherein the reaction substance activates the sodium chlorite.
16. The applicator of claim 1, wherein the application substance is sodium hypochlorite, and wherein the reaction substance activates the sodium hypochlorite.
17. The applicator of claim 1, wherein the application substance is a bleaching compound, and wherein the reaction substance is a colorant.
18. The applicator of claim 1, wherein the application substance is a first epoxy reactant, wherein the reaction substance is a second epoxy reactant, and wherein the first and second epoxy reactants, when combined, form an epoxy.
19. The applicator of claim 1, wherein the application substance is a combination of two complementary epoxy reactants, and wherein the reaction substance is an epoxy catalyst.
20. The applicator of claim 1, wherein the application substance is a combination of a base and a surfactant, and wherein the reaction substance is an acid.

21. The applicator of claim 1, wherein the application substance is a combination of an acid and a surfactant, and wherein the reaction substance is a base.

22. The applicator of claim 1, wherein the application substance is a first precipitation reactant, wherein the reaction substance is a second precipitation reactant, and wherein the first and second precipitation reactants, when combined, form a precipitant.

23. The applicator of claim 22, wherein the first precipitation reactant is adapted to have a cleaning effect when used without combination with the second precipitation reactant.

24. The applicator of claim 22, wherein the second precipitation reactant is adapted to have a cleaning effect when used without combination with the first precipitation reactant.

25. An applicator for applying a substance, the applicator comprising an application side and an opposed reactive side, the application side including an application substance and the reactive side including a reaction substance, wherein the application substance is deposited on a target surface, and wherein the reaction substance supplements the action of the application substance when the application and reactive sides of the applicator are sequentially wiped on the target surface.

26. The applicator of claim 25, wherein the application and reaction substances are complementary.

27. The applicator of claim 25, wherein the reaction substance is deposited on the target surface.

28. The applicator of claim 25, wherein the application substance is a cleaning substance, and wherein the reaction substance is a resoil preventative.

29. The applicator of claim 28, wherein the resoil preventative is an insect repellent.

30. An applicator for applying a substance, the applicator comprising an application side and an opposed reactive side, the application side including an application substance and the reactive side including a reaction substance, wherein the application and reaction substances are deposited on a target surface when the application and reactive sides of the applicator are sequentially wiped on the target surface.

31. The applicator of claim 30, wherein the application and reaction substances are reactive substances.

32. The applicator of claim 30, wherein the application and reaction substances are complementary substances.

33. A method for treating a target surface, the method comprising:
contacting the target surface with an application side of an applicator including an application substance, whereby the application substance is deposited onto the target surface; and

thereafter contacting the target surface with a reactive side of the applicator including a reaction substance, whereby the reaction substance reacts with the application substance.

34. The method of claim 33, whereby the reaction substance is deposited onto the target surface.

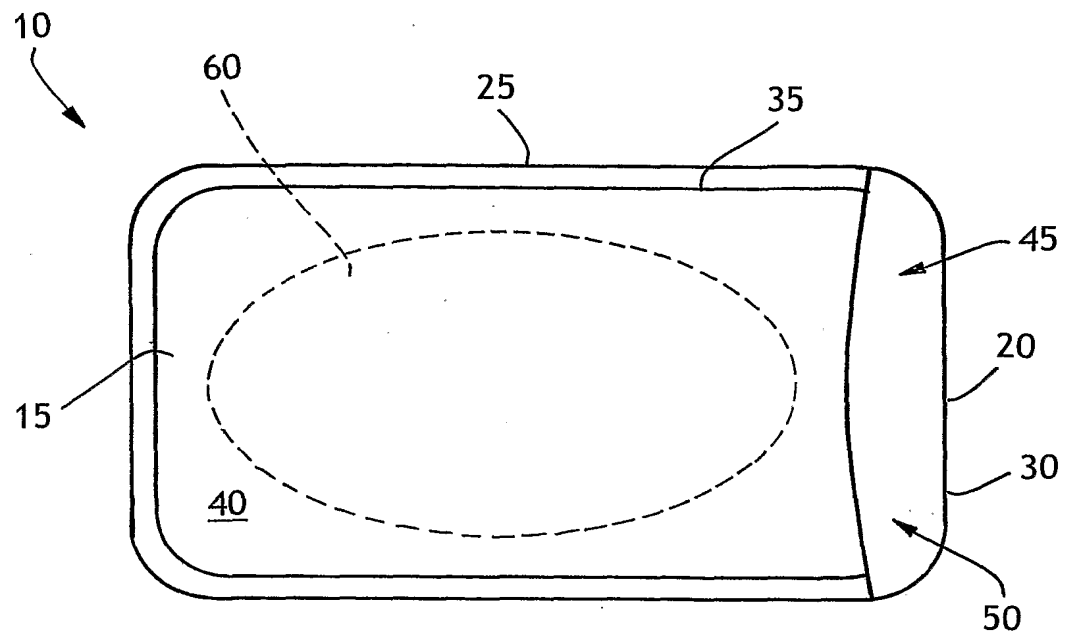


FIG. 1

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2006/043029

A. CLASSIFICATION OF SUBJECT MATTER
INV. A47L13/17 A47L13/19

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A47L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EP0-Internal

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X	US 5 763 332 A (GORDON GREGORY CHARLES [US] ET AL) 9 June 1998 (1998-06-09) column 1, line 13 - line 14; figure 3 column 4, line 63 - column 5, line 4 column 18, line 7 - line 9	1, 2, 6-9, 21, 25-27, 30-34
Y	column 18, line 17 - line 26	3-5, 10-12, 16
Y	US 2005/244211 A1 (BRUNNER MICHAEL S [US] ET AL) 3 November 2005 (2005-11-03) paragraphs [0005], [0006]	3, 4
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☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

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- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *&* document member of the same patent family

Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

International application No

PCT/US2006/043029

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
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A	US 2005/244212 A1 (BRUNNER MICHAEL S [US] ET AL) 3 November 2005 (2005-11-03) column 1, line 1 - line 35 column 2, line 11 - line 17 -----	1-34
A	US 4 812 067 A (BROWN JAMES B [US] ET AL) 14 March 1989 (1989-03-14) the whole document -----	1-34

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Information on patent family members

International application No

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